

# 21

Attorney Docket No. 3600.100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of ) Examiner: C. Verdier  
DAVID A. SPEAR ET AL. ) Group Art Unit: 3745  
Appln. No.: 09/343,736 )  
Filed: June 30, 1999 ) Date: February 27, 2002  
For: SWEPT TURBOMACHINERY )  
BLADE )

Assistant Commissioner for Patents  
Box Patent Application  
Washington, D.C. 20231

SUBMISSION OF SUPPLEMENTAL REISSUE APPLICATION

Sir:

Further to the Advisory Action dated January 8, 2002, enclosed please find a Supplemental Reissue Declaration for the above-identified application.

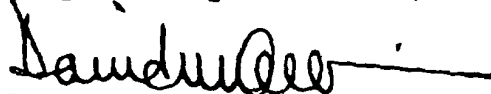
The enclosed Supplemental Reissue Declaration consists of two originals, one executed by the inventors Bruce P. Biederman and John A. Orosa, and the other executed by Dennis N. Kantor, executor of the estate of inventor David A. Spear, deceased. Proof of Mr. Kantor's authority to take action on behalf of David A. Spear has been filed in the present application.

Any fees in connection with this paper may be charged to Deposit Account No. 50-0409.

Pursuant to the statement on page 2 of the Advisory Action, it is believed that the present application, with claims 1-7, 9-11, 13, 14, 16, 17, 19-23, and 27-44, as amended in the Amendment After Final Rejection of November 27, 2001, is now allowable.

If any issues remain to be resolved before allowance of the present application, the Examiner is requested to telephone the applicants' undersigned attorney.

Respectfully submitted,



Attorney for Applicants

Registration No. 26,641

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Filed: June 30, 1999	)	
For: SWEPT TURBOMACHINERY	)	Application to reissue
BLADE	)	U.S. Patent No. 5,642,985

Assistant Commissioner for Patents  
Washington, D.C. 20231

SUPPLEMENTAL REISSUE DECLARATION

Sir:

We, DAVID A. SPEAR, who was a United States citizen residing at Manchester, Connecticut, at the time of his death on October 22, 1995, BRUCE P. BIEDERMAN, a United States citizen residing at Meriden, Connecticut, and JOHN A. OROSA, a United States citizen residing at Palm Beach Gardens, Florida, hereby declare and say that:

Every error in U.S. Patent No. 5,642,985 that has been corrected in the present reissue application, and is not covered by the prior declaration submitted in this application, arose without any deceptive intention on any of our parts. Namely, we believe that the original said patent is partly inoperative by reason of claiming less than we had the right to claim in that patent. Specifically, we believe that we were entitled to claims to at least the following subject matter:

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A turbomachinery blade for a gas turbine engine fan comprising a plurality of blades mounted for rotation about a fan axis with neighboring blades forming passages for a working medium gas, wherein:

the blade has a configuration enabling the fan to rotate at speeds providing supersonic flow velocities over the blade in at least a portion of each passage causing the formation of a shock in the gas adjacent an inner wall of a case forming an outer boundary for the working medium gas flowing through the passages;

the blade has a leading edge with an inner region ending at an inward boundary of an intermediate region and a tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region being swept forward and the intermediate region being swept rearward at a sweep angle that does not decrease; and

the tip region is translated forward relative to a leading edge with the same sweep angle as the outward boundary of the intermediate region, to provide a sweep angle that causes the blade to intercept the shock.

A blade for a gas turbine engine fan comprising a plurality of blades mounted for rotation within a case circumscribing the blades and forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

the blade has a configuration enabling the fan to rotate at speeds providing supersonic flow velocities over the blade in at least a portion of each passage;

the blade has a leading edge with an inner region ending at an inward boundary of an intermediate region and a tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region being swept forward and the intermediate region being swept rearward at a sweep angle that does not decrease from the inward boundary of the intermediate region to the outward boundary of the intermediate region; and

throughout the tip region the sweep angle is less than the sweep angle at the outward boundary of the intermediate region.

A gas turbine engine fan, comprising a plurality of blades mounted for rotation within a case circumscribing the blades and forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

each blade has a configuration enabling the fan to rotate at speeds providing supersonic working medium gas velocities over the blade at least in the vicinity of the passages proximate to the case;

each blade has a leading edge with an inner region ending at an inward boundary of a swept intermediate region and a swept tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region of each blade being swept forward and the intermediate region of each blade being swept rearward at a sweep angle that does not decrease from the inward boundary of the intermediate region to the outward boundary of the intermediate region; and

throughout the tip region the sweep angle of each blade is less than the sweep angle at the outward boundary of the intermediate region.

A gas turbine engine fan comprising a plurality of identical blades, each blade being mounted for rotation within a case circumscribing the blades and having an inner wall forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

each blade has a configuration enabling the fan to rotate at speeds providing supersonic working medium gas velocities over the blade in the vicinity of the passages proximate to the case;

each blade has a leading edge with an inner region, an intermediate region and a tip region, the inner region extending to an inward boundary of the intermediate region, and the tip region extending from an outward boundary of the intermediate region to a tip end of the blade; and

the inner region is swept forward, the intermediate region is swept rearward at a sweep angle that does not decrease, and the tip region is translated forward relative to a leading edge with the same sweep angle as the outward boundary of the intermediate region.

A blade for a gas turbine engine rotatable within a case at speeds providing supersonic flow over at least a portion of the blade, wherein the blade has a leading edge with a forward swept inner region, the inner region ending at a rearward swept middle region having a sweep angle that does not decrease throughout the middle region, the middle region ending at a tip region that is translated forward relative to a leading edge with the same sweep angle as the end of the middle region.

A blade for a gas turbine engine rotatable within a case at speeds providing supersonic flow over at least a portion of the blade, wherein the blade has a leading edge with a forward swept middle region having a sweep angle that does not decrease throughout the middle region and ending at a tip region that is translated rearward relative to a leading edge with the same sweep angle as the end of the middle region.

Each of us hereby declares that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title XVIII of United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Date: \_\_\_\_\_

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Date: 1/14/02

  
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Date: 1/15/02

  
John A. Orosa

Attorney Docket No. 3600.100

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Every error in U.S. Patent No. 5,642,985 that has been corrected in the present reissue application, and is not covered by the prior declaration submitted in this application, arose without any deceptive intention on any of our parts. Namely, we believe that the original said patent is partly inoperative by reason of claiming less than we had the right to claim in that patent. Specifically, we believe that we were entitled to claims to at least the following subject matter:

09/343,736-063099

A turbomachinery blade for a gas turbine engine fan comprising a plurality of blades mounted for rotation about a fan axis with neighboring blades forming passages for a working medium gas, wherein:

the blade has a configuration enabling the fan to rotate at speeds providing supersonic flow velocities over the blade in at least a portion of each passage causing the formation of a shock in the gas adjacent an inner wall of a case forming an outer boundary for the working medium gas flowing through the passages;

the blade has a leading edge with an inner region ending at an inward boundary of an intermediate region and a tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region being swept forward and the intermediate region being swept rearward at a sweep angle that does not decrease; and

the tip region is translated forward relative to a leading edge with the same sweep angle as the outward boundary of the intermediate region, to provide a sweep angle that causes the blade to intercept the shock.

A blade for a gas turbine engine fan comprising a plurality of blades mounted for rotation within a case circumscribing the blades and forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

the blade has a configuration enabling the fan to rotate at speeds providing supersonic flow velocities over the blade in at least a portion of each passage;

the blade has a leading edge with an inner region ending at an inward boundary of an intermediate region and a tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region being swept forward and the intermediate region being swept rearward at a sweep angle that does not decrease from the inward boundary of the intermediate region to the outward boundary of the intermediate region; and

throughout the tip region the sweep angle is less than the sweep angle at the outward boundary of the intermediate region.

A gas turbine engine fan, comprising a plurality of blades mounted for rotation within a case circumscribing the blades and forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

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each blade has a configuration enabling the fan to rotate at speeds providing supersonic working medium gas velocities over the blade at least in the vicinity of the passages proximate to the case;

each blade has a leading edge with an inner region ending at an inward boundary of a swept intermediate region and a swept tip region beginning at an outward boundary of the intermediate region and extending to a tip end of the blade, the inner region of each blade being swept forward and the intermediate region of each blade being swept rearward at a sweep angle that does not decrease from the inward boundary of the intermediate region to the outward boundary of the intermediate region; and

throughout the tip region the sweep angle of each blade is less than the sweep angle at the outward boundary of the intermediate region.

A gas turbine engine fan comprising a plurality of identical blades, each blade being mounted for rotation within a case circumscribing the blades and having an inner wall forming an outer boundary for a working medium gas flowing through passages formed by neighboring blades, wherein:

each blade has a configuration enabling the fan to rotate at speeds providing supersonic working medium gas velocities over the blade in the vicinity of the passages proximate to the case;

each blade has a leading edge with an inner region, an intermediate region and a tip region, the inner region extending to an inward boundary of the intermediate region, and the tip region extending from an outward boundary of the intermediate region to a tip end of the blade; and


the inner region is swept forward, the intermediate region is swept rearward at a sweep angle that does not decrease, and the tip region is translated forward relative to a leading edge with the same sweep angle as the outward boundary of the intermediate region.

A blade for a gas turbine engine rotatable within a case at speeds providing supersonic flow over at least a portion of the blade, wherein the blade has a leading edge with a forward swept inner region, the inner region ending at a rearward swept middle region having a sweep angle that does not decrease throughout the middle region, the middle region ending at a tip region that is translated forward relative to a leading edge with the same sweep angle as the end of the middle region.

A blade for a gas turbine engine rotatable within a case at speeds providing supersonic flow over at least a portion of the blade, wherein the blade has a leading edge with a forward swept middle region having a sweep angle that does not decrease throughout the middle region and ending at a tip region that is translated rearward relative to a leading edge with the same sweep angle as the end of the middle region.

Each of us hereby declares that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title XVIII of United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Date: 1/14/02

  
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Date: \_\_\_\_\_

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Bruce P. Biederman

Date: \_\_\_\_\_

\_\_\_\_\_  
John A. Orosa

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DAVID M. QUINLAN

PAGE 02

Attorney Docket: 3600.100

Appln. No.: 09/343,736

Date: February 27, 2002

The stamp of the mailroom of the Patent and Trademark Office  
hereon will acknowledge receipt of the following:

1. Submission of Supplemental Reissue  
Declaration.
2. Supplemental Reissue Declaration executed  
by Bruce P. Riederman and John A. Orosa.
3. Supplemental Reissue Declaration executed  
by Dennis N. Kantor.

RECEIVED

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